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OKID (JP p2000-183224 A)

— TRANSLATION OF OKID —

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CLAIMS

[Claim(s)]

[Claim 1] The substrate with which the 1st and 2nd wiring was formed, and the semiconductor device carried in said substrate, The 1st metal thin line which connects the 1st connection of said 1st wiring, and the 1st electrode of said semiconductor device, The 2nd metal thin line which connects the 2nd connection of said 2nd wiring, and the 2nd electrode of said semiconductor device, It has resin which closes said semiconductor device. The inside of said 1st connection and said 2nd connection, The plastic molded type semiconductor device with which the connections where the height from the same side of said substrate is located in the distance from said semiconductor device are characterized by being higher than the connection of the direction located near said semiconductor device.

[Claim 2] The plastic molded type semiconductor device characterized by forming more thickly than wiring which has the connection of the direction located near said semiconductor device the direction of wiring which has the connection located in the distance from said semiconductor device among said 1st connection and said 2nd connection in a plastic molded type semiconductor device according to claim 1.

[Claim 3] Wiring which has the connection of the direction located in the distance from said semiconductor device among said 1st connection and said 2nd connection in a plastic molded type semiconductor device according to claim 1 is a plastic molded type semiconductor device characterized by being formed through an insulating layer after wiring which has the connection of the direction located near said semiconductor device.

[Claim 4] It is the plastic molded type semiconductor device characterized by said insulating layer containing heat resistant resin in a plastic molded type semiconductor device according to claim 3.

[Claim 5] The part in which said semiconductor device in said substrate is carried in a plastic molded type semiconductor device according to claim 1 is a plastic molded type semiconductor device characterized by including a heat dissipation ingredient.

[Claim 6] It is the plastic molded type semiconductor device which said 1st wiring is

wiring for power sources or wiring wiring for touch-down which was formed in the perimeter of said semiconductor device in the shape of a ring, and which supplies power-source potential or touch-down potential to said semiconductor device in a plastic molded type semiconductor device according to claim 1 to 5, and is characterized by for said 2nd wiring to be wiring for actuating signals which was formed in the perimeter of said 1st wiring in the shape of a column toward said semiconductor device, and which transmits the actuating signal of said semiconductor device.

[Claim 7] It is the plastic molded type semiconductor device characterized by for said substrate having the level difference section in the plastic molded type semiconductor device according to claim 1, and forming said 1st and 2nd wiring on said level difference section.

[Claim 8] With the 1st connection with the 1st metal thin line [in / the 1st and 2nd wiring is formed on the same field of a substrate, and / said 1st wiring] The height from the same field of said substrate among the 2nd connection with the 2nd metal thin line in said 2nd wiring The process for which the substrate with which the connections located in the distance from the semiconductor device loading side are higher than the connection of the direction located near said semiconductor device loading side is prepared, The process which carries a semiconductor device on said semiconductor device loading side of said substrate, The process which connects said 1st connection and 1st electrode of said semiconductor device with said 1st metal thin line, and connects said 2nd connection and 2nd electrode of said semiconductor device with said 2nd metal thin line, The manufacture approach of the plastic molded type semiconductor device characterized by having the process which closes said semiconductor device with closure resin.

[Claim 9] The manufacture approach of a plastic molded type semiconductor device according to claim 8 is the manufacture approach of the plastic molded type semiconductor device characterized by having the process which forms the electric conduction film on the connection of the direction located in the distance from said semiconductor device loading side among said 1st connection and said 2nd connection.

[Claim 10] The manufacture approach of a plastic molded type semiconductor device according to claim 8 is the manufacture approach of the plastic molded type semiconductor device characterized by having the process which forms the connection of the direction located in the distance through an insulating layer among said 1st connection and said 2nd connection on the connection of the direction located near said semiconductor device loading side from said semiconductor device loading side.

[Claim 11] The manufacture approach of a plastic molded type semiconductor device according to claim 8 is the manufacture approach of the plastic molded type

semiconductor device characterized by having the process which forms said semiconductor device loading side of said substrate with a heat dissipation ingredient.
[Claim 12] The manufacture approach of a plastic molded type semiconductor device according to claim 8 to 11 is the manufacture approach of the plastic molded type semiconductor device characterized by having the process which forms said 2nd wiring in the shape of a column toward said semiconductor device loading side, and the process which forms said 1st wiring in the perimeter of said semiconductor device loading side in the shape of a ring.

[Detailed Description of the Invention]
[0001]
[Field of the Invention] By forming wiring of two different height on the same field of the substrate in which a semiconductor device is carried, the metal thin lines which connect the electrode of a semiconductor device and wiring short-circuit, or this invention relates to the reliable plastic molded type semiconductor device which can control that a metal thin line and wiring short-circuit, and its manufacture approach.
[0002]
[Description of the Prior Art] It is required that a power source and an earth terminal should be lessened as much as possible in connection with the formation of many pins and improvement in the speed progressing, and a signal terminal should be increased in a plastic molded type semiconductor device from the former. Therefore, the increase and the plastic molded type semiconductor device carried out are proposed in the signal terminal by forming in a multistage configuration the part in which wiring of the wiring substrate in which the number of a power source and earth terminals is carried out few, and a semiconductor device is carried is formed by forming a power source and an earth terminal in the shape of a ring.
[0003] In such a conventional plastic molded type semiconductor device, the signal, the power source, and the field in which wiring for touch-down is formed are formed in the shape of a stairway (multilevel structure) so that the perimeter of the substrate side in which a semiconductor device is carried may be surrounded. Such a multilevel structure is formed by sticking two or more wiring substrates using adhesives, and each wiring and an external terminal are connected through the conductive matter formed in opening in each lamination part of a wiring substrate. And for example, wiring for power sources of the shape of the signal wiring of post-like plurality the 1st step and a ring of a substrate is formed, and the signal wiring of the shape of a post of the plurality [step / 2nd] of a substrate, and ring-like wiring for touch-down are formed. Here, the ring-like power source and wiring for touch-down in each stage are formed so that it may be enclosed by the signal wiring of two or more shape of a post which can be set in each stage, respectively.

[0004] As mentioned above, the tooth space in which the signal wiring of the shape of a post in each stage can be connected to an external terminal through the conductive matter formed in opening in each lamination part of a wiring substrate, consequently the external terminal of a wiring substrate is formed is securable by forming the signal wiring of the shape of a post in each stage in the ring-like power source and the outside of wiring for touch-down. And shape of post and ring-like wiring formed in each stage and the electrode of a semiconductor device are connected by the metal thin line, and the plastic molded type semiconductor device is formed by closing a semiconductor device by resin.
[0005]

[Problem(s) to be Solved by the Invention] However, in the above conventional plastic molded type semiconductor devices, in each stage, since post-like signal wiring, a ring-like power source, or wiring for touch-down was formed in the height almost same on the same field of a substrate, metal thin lines might short-circuit and wiring on the substrate to which a metal thin line should be connected essentially and which does not come out might be contacted. There was a problem that the dependability of the semiconductor device which has as a result, for example, many pins, will fall. Moreover, since there is a danger that metal thin lines will short-circuit, it becomes difficult to connect the electrode of a semiconductor device and wiring of a substrate, making a metal thin line cross in three dimensions. Consequently, there was a problem that the degree of freedom of connection will be restrained.
[0006] Moreover, in the conventional plastic molded type semiconductor device, since wiring for signals in each stage of a substrate is formed in the outside of a power source or wiring for touch-down, the metal thin line connected to signal wiring becomes long. That is, since the thin part (metal thin line) of the path which a signal transmits became long, in the semiconductor device, the noise might increase and working speed might fall. In order to solve such a technical problem, forming wiring for signals inside a power source or wiring for touch-down is also considered. However, by such approach, wiring for signals must be electrically connected to an external terminal through the interior of a wiring substrate through the field of an opposite hand with the field in which opening was formed on the level difference section front face of the substrate with which wiring for signals was formed, and wiring for signals was formed. If the field which forms opening in the field of the direction in which wiring for signals of a substrate was formed at this time is needed and wiring for signals is formed at all, it is difficult to form opening.
[0007] Furthermore, it sets to the conventional plastic molded type semiconductor device. When the adhesives used in case a wiring substrate is formed in a multilevel structure stick a wiring substrate, it oozes out into a post-like wiring part. The part which can be effectively used as wiring about post-like wiring decreases, that is, the

area of the part to which the metal thin line in post-like wiring is connected might decrease, and it might have become difficult to connect a metal thin line. Although securing many substrate fields which form post-like wiring is also considered in order to prevent this, the problem that the semiconductor device itself will become large occurs.
[0008]

[Means for Solving the Problem] The semiconductor device by which this invention was carried in the substrate with which the 1st and 2nd wiring was formed, and this substrate, The 1st metal thin line which connects the 1st connection of the 1st wiring, and the 1st electrode of a semiconductor device, The 2nd metal thin line which connects the 2nd connection of the 2nd wiring, and the 2nd electrode of a semiconductor device, It has resin which closes a semiconductor device. The inside of the 1st connection and the 2nd connection, The height from the same side of a substrate by offering the plastic molded type semiconductor device with which the connections located in the distance from the semiconductor device are higher than the connection of the direction located near the semiconductor device It prevents contacting the short circuit of metal thin lines, and wiring on the substrate to which a metal thin line should be connected essentially and which does not come out, and the dependability of the semiconductor device which has many pin-connected construction is raised.
[0009] With moreover, the 1st connection with the 1st metal thin line [in / as for this invention, the 1st and 2nd wiring is formed on the same field of a substrate, and / the 1st wiring] The height from the same field of said substrate among the 2nd connection with the 2nd metal thin line in the 2nd wiring The process for which the substrate with which the connections located in the distance from the semiconductor device loading side are higher than the connection of the direction located near the semiconductor device loading side is prepared, The process which connects the process which carries a semiconductor device on the semiconductor device loading side of a substrate, and the 1st connection and the 1st electrode of a semiconductor device with the 1st metal thin line, and connects the 2nd connection and the 2nd electrode of a semiconductor device with the 2nd metal thin line, By offering the manufacture approach of a plastic molded type semiconductor device of having the process which closes a semiconductor device with closure resin, it prevents contacting the short circuit of metal thin lines, and wiring on the substrate to which a metal thin line should be connected essentially and which does not come out, and the degree of freedom of connection is raised.
[0010]

[Embodiment of the Invention] The gestalt of operation of this invention is explained

referring to a drawing below.

[0011] Drawing 1 (a) is the sectional view of the plastic molded type semiconductor device in which the gestalt of operation of the 1st of this invention is shown. Drawing 1 (b) is a top view showing connection by the metal thin line of the electrode of a semiconductor device, and each wiring in the plastic molded type semiconductor device in which the gestalt of operation of the 1st of this invention is shown.

[0012] The wiring substrate 101 is formed by sticking Substrates 101A-101E using the insulating adhesives 102. Substrate 101A is a substrate for carrying a semiconductor device 114. As this substrate 101A, what consists of a glass epoxy resin, copper, aluminum, etc. is mentioned. Moreover, when the substrate which consists of copper or aluminum is used, a semiconductor device is operated and the semiconductor device itself generates heat, substrate 101A achieves the function as a heat sink.

[0013] The post-like wiring 103 for signals and the ring-like wiring 104 for power sources are formed in substrate 101B stuck on substrate 101A by forming a copper (Cu) foil in the front face by the thickness of 12-18 micrometers. On substrate 101B, substrate 101D is stuck by the insulating adhesives 102 through substrate 101C. Here, when substrate 101C intervenes between substrate 101B and substrate 101D, a short circuit with the post-like wiring 103 for signals on substrate 101B mentioned later and the ring-like wiring 106 for touch-down on substrate 101D can be prevented.

[0014] The post-like wiring 105 for signals and the ring-like wiring 106 for touch-down are formed in substrate 101D by forming a copper (Cu) foil in the front face by the thickness of 12-18 micrometers. Here, the object for power sources and the ring-like wiring 104 and 106 for touch-down are formed covering the field of an opposite hand from the substrate side of the direction in which the post-like wiring 103 and 105 for signals is formed, respectively.

[0015] On substrate 101D, substrate 101E is stuck by the insulating adhesives 102. On substrate 101E, the copper (Cu) foil used as wiring 107 is formed by the thickness of 9-35 micrometers. On wiring 107, the external terminals 108A-108D which consist of solder etc. are formed. In order to take the electrical installation of each above-mentioned wiring (the object for power sources and the ring-like wiring 104 and 106 for touch-down, post-like wiring 103 and 105 for signals), and the external terminals 108A-108D. Openings 109A-109D are formed in Substrates 101B-101E. And the copper (Cu) plating film 110A-110D is formed in the side face of the openings 109A-109D. That is, the external terminals 108A-108D are connected to the ring-like wiring 104 for power sources, the post-like wiring 103 for signals, the ring-like wiring 106 for touch-down, and the post-like wiring 105 for signals through the copper (Cu) plating film 110A-110D formed in Openings 109A-109D, respectively, respectively.

[0016] And on the ring-like wiring 104 for power sources, and the ring-like wiring 106 for touch-down, sequential formation of the copper (Cu) plating film 111 is carried out by the thickness 2-5 micrometers and whose golden (Au) plating film 113 10-15 micrometers and (Nickel nickel) plating film 112 are 0.3-0.5 micrometers. On the other hand, on the post-like wiring 103 for signals, and 105, sequential formation of the copper (Cu) plating film 111 is carried out by the thickness 2-5 micrometers and whose golden (Au) plating film 113 20-100 micrometers and (Nickel nickel) plating film 112 are 0.3-0.5 micrometers.

[0017] Moreover, the semiconductor device 114 is carried on substrate 101A, and the electrodes 115A-115D of a semiconductor device 114 are connected to the ring-like wiring 104 for power sources, the post-like wiring 103 for signals, the ring-like wiring 106 for touch-down, and the post-like wiring 105 for signals by the metal thin lines 116A-116D, respectively. A semiconductor device 114 and the metal thin lines 116A-116D are closed with closure resin 117, and a plastic molded type semiconductor device as shown in drawing 1 is obtained.

[0018] With the gestalt of the 1st operation, post-like wiring of the outside currently formed on the same substrate side as inside ring-like wiring is formed as mentioned above more thickly than inside ring-like wiring. That is, the post-like wiring 103 for signals formed on substrate 101B is formed more thickly than the ring-like wiring 104 for power sources formed on the same substrate 101B. Moreover, the post-like wiring 105 for signals formed on substrate 101D is formed more thickly than the ring-like wiring 106 for touch-down formed on the same substrate 101D. Consequently, a part for each connection of post-like wiring on the same field of a substrate (outside) and the metal thin line in ring-like wiring (inside) will be formed in the location from the same field of a substrate where the direction for a connection [wiring / (outside) / post-like] is higher than a part for the connection of ring-like wiring (inside). Therefore, when the electrodes 115A-115D of a semiconductor device 114 and wiring (the object for power sources and the ring-like wiring 104 and 106 for touch-down, post-like wiring 103 and 105 for signals) on a substrate are connected with the metal thin lines 116A-116D, the short circuit of metal thin lines or a short circuit with a metal thin line and wiring on a substrate can be prevented. For example, a short circuit with metal thin line 116A and metal thin line 116B, a short circuit with metal thin line 116C and metal thin line 116D, a short circuit with metal thin line 116B and the ring-like wiring 104 for power sources, and a short circuit with metal thin line 116D and the ring-like wiring 106 for touch-down can be prevented, and the dependability of the semiconductor device which has many pin-connected construction can be raised. Furthermore, making a metal thin line cross, it also becomes easy to connect the electrode of a semiconductor device and each wiring of a substrate, and its degree of freedom of connection improves.

[0019] Moreover, in order to prepare a level difference in the gestalt of the 1st

operation between post-like wiring (outside) and ring-like wiring (inside) which were formed on the same field of a substrate Although the copper (Cu) plating film 111 of post-like wiring formed outside was formed more thickly than the copper (Cu) plating film 111 of ring-like wiring formed inside By forming thickly the (Nickel nickel) plating film 112 metallurgy (Au) plating film 113, a level difference may be prepared between post-like wiring (outside) and ring-like wiring (inside) which were formed on the same field of a substrate. For example, (Nickel nickel) plating film 112 may be formed by the thickness of 10-20 micrometers.

[0020] Drawing 2 (a) is the sectional view of the plastic molded type semiconductor device in which the gestalt of operation of the 2nd of this invention is shown. Drawing 2 (b) is a top view showing connection by the metal thin line of the electrode of a semiconductor device, and each wiring in the plastic molded type semiconductor device in which the gestalt of operation of the 2nd of this invention is shown.

[0021] The wiring substrate 201 is formed by sticking Substrates 201A-201E using the insulating adhesives 202. Substrate 201A is a substrate for carrying a semiconductor device 214. As this substrate 201A, what consists of a glass epoxy resin, copper, aluminum, etc. is mentioned. Moreover, when the substrate which consists of copper or aluminum is used, a semiconductor device is operated and the semiconductor device itself generates heat, substrate 201A achieves the function as a heat sink.

[0022] The post-like wiring 203 for signals and the ring-like wiring 204 for power sources are formed in substrate 201B stuck on substrate 201A by forming a copper (Cu) foil in the front face by the thickness of 12-18 micrometers. On substrate 201B, substrate 201D is stuck by the insulating adhesives 202 through substrate 201C. Here, when substrate 201C intervenes between substrate 201B and substrate 201D, a short circuit with the post-like wiring 203 for signals on substrate 201B mentioned later, the ring-like wiring 204 for power sources, and the ring-like wiring 206 for touch-down on substrate 201D can be prevented. Or substrate 201D may use what was formed in thickness in which the post-like wiring 203 for signals, the ring-like wiring 204 for power sources, and the ring-like wiring 206 for touch-down do not short-circuit, without using substrate 201C. The post-like wiring 205 for signals and the ring-like wiring 206 for touch-down are formed in substrate 201D by forming a copper (Cu) foil in the front face by the thickness of 12-18 micrometers.

[0023] On substrate 201D, substrate 201E is stuck by the insulating adhesives 202. On substrate 201E, the copper (Cu) foil used as wiring 207 is formed by the thickness of 9-35 micrometers. On wiring 207, the external terminals 208A-208D which consist of solder etc. are formed. In order to take the electrical installation of each above-mentioned wiring (the object for power sources and the ring-like wiring 204 and 206 for touch-down, post-like wiring 203 and 205 for signals), and the external terminals 208A-208D, Openings 209A-209D are formed in Substrates 201B-201E.

And the copper (Cu) plating film 210A-210D is formed in the side face of the openings 209A-209D. That is, the external terminals 208A-208D are connected to the ring-like wiring 204 for power sources, the post-like wiring 203 for signals, the ring-like wiring 206 for touch-down, and the post-like wiring 205 for signals through the copper (Cu) plating film 210A-210D formed in Openings 209A-209D, respectively, respectively. And on the ring-like wiring 204 for power sources, and the ring-like wiring 206 for touch-down, sequential formation of the copper (Cu) plating film 211 is carried out by the thickness 2-5 micrometers and whose golden (Au) plating film 213 10-15 micrometers and (Nickel nickel) plating film 212 are 0.3-0.5 micrometers. On the other hand, on the post-like wiring 203 for signals, and 205, sequential formation of the copper (Cu) plating film 211 is carried out by the thickness 2-5 micrometers and whose golden (Au) plating film 213 20-100 micrometers and (Nickel nickel) plating film 212 are 0.3-0.5 micrometers.

[0024] Moreover, the semiconductor device 214 is carried on substrate 201A, and the electrodes 215A-215D of a semiconductor device 214 are connected to the ring-like wiring 204 for power sources, the post-like wiring 203 for signals, the ring-like wiring 206 for touch-down, and the post-like wiring 205 for signals by the metal thin lines 216A-216D, respectively. A semiconductor device 214 and the metal thin lines 216A-216D are closed with closure resin 217, and a plastic molded type semiconductor device as shown in drawing 2 is obtained.

[0025] With the gestalt of the 2nd operation, as mentioned above by forming two wiring formed on one substrate on the same field Thickness of substrate 201C which intervenes between substrate 201B and substrate 201D in order to prevent a short circuit with the post-like wiring 203 for signals on substrate 201B and the ring-like wiring 206 for touch-down on substrate 201D can be made thin compared with the case of the gestalt of the 1st operation. Consequently, the whole semiconductor device can be miniaturized. Moreover, if substrate 201D uses what was formed in thickness in which the post-like wiring 203 for signals, the ring-like wiring 204 for power sources, and the ring-like wiring 206 for touch-down do not short-circuit, without minding substrate 201C, it will become possible to miniaturize the whole semiconductor device further.

[0026] Drawing 3 (a) is the sectional view of the plastic molded type semiconductor device in which the gestalt of operation of the 3rd of this invention is shown. Drawing 3 (b) is a top view showing connection by the metal thin line of the electrode of a semiconductor device, and each wiring in the plastic molded type semiconductor device in which the gestalt of operation of the 3rd of this invention is shown.

[0027] The wiring substrate 301 is formed by sticking Substrates 301A-301E using the insulating adhesives 302. Substrate 301A is a substrate for carrying a semiconductor device 314. As this substrate 301A, what consists of a glass epoxy resin, copper, aluminum, etc. is mentioned. Moreover, when the substrate which

consists of copper or aluminum is used, a semiconductor device is operated and the semiconductor device itself generates heat, substrate 301A achieves the function as a heat sink.

[0028] The post-like wiring 303 for signals and post-like wiring 304B for power sources which should be connected to ring-like wiring 304A for power sources mentioned later are formed in substrate 301B stuck on substrate 301A by forming a copper (Cu) foil in the front face by the thickness of 12-18 micrometers.

[0029] On substrate 301B, substrate 301D is stuck by the insulating adhesives 302 through substrate 301C. Here, when substrate 301C intervenes between substrate 301B and substrate 301D, a short circuit with ring-like wiring 304A for power sources on substrate 301B mentioned later and the post-like wiring 306 (or post-like wiring 306for touch-down B) for signals on substrate 301D can be prevented. The post-like wiring 305 for signals and post-like wiring 306B for touch-down which should be connected to ring-like wiring 306A for touch-down mentioned later are formed in substrate 301D by forming a copper (Cu) foil in the front face by the thickness of 12-18 micrometers.

[0030] On substrate 301D, substrate 301E is stuck by the insulating adhesives 302. On substrate 301E, the copper (Cu) foil used as wiring 307 is formed by the thickness of 9-35 micrometers. On wiring 307, the external terminals 308A-308D which consist of solder etc. are formed.

[0031] In order to take the electrical installation of post-like wiring 304for power sources B, the post-like wiring 303 for signals, post-like wiring 306for touch-down B, the post-like wiring 305 for signals, and the external terminals 308A-308D, Openings 309A-309D are formed in Substrates 301C-301E. And the copper (Cu) foils 310A-310D are formed in the side face of the openings 309A-309D. That is, the external terminals 308A-308D are connected to post-like wiring 304for power sources B, the post-like wiring 303 for signals, post-like wiring 306for touch-down B, and the post-like wiring 305 for signals through the copper (Cu) plating film 310A-310D formed in Openings 309A-309D, respectively, respectively.

[0032] And after two or more above-mentioned post-like wiring, ring-like wiring 304for power sources A and ring-like wiring 306A for touch-down are formed through the insulating layer 318. Here, as an ingredient of an insulating layer 318, it is desirable to use heat resistant resin, such as polyimide. Moreover, ring-like wiring 304for power sources A and ring-like wiring 306A for touch-down are arranged through an insulating layer 318 on the post-like wiring 303 for signals, and 305, being pushed by metal thermocompression bonding tools, such as stainless steel heated by 100 degrees C - about 400 degrees C, after being separately formed in the shape of a ring. And ring-like wiring 304for power sources A and ring-like wiring 306A for touch-down are connected to post-like wiring 304for power sources B, and post-like wiring 306B for touch-down by the metal thin line 319, respectively. Moreover,

ring-like wiring is formed so that a part for a connection with the metal thin line 319 and the metal thin lines 316A-316D mentioned later in post-like wiring may be surrounded, as shown in drawing 3 (b). On post-like wiring and ring-like wiring, (Nickel nickel) plating film may be carried out by the thickness of 2-5 micrometers, and sequential formation of the golden (Au) plating film may be carried out by the thickness of 0.3-0.5 micrometers.

[0033] Moreover, the semiconductor device 314 is carried on substrate 301A, and the electrodes 315A-315D of a semiconductor device 314 are connected to ring-like wiring 304for power sources A, the post-like wiring 303 for signals, ring-like wiring 306for touch-down A, and the post-like wiring 305 for signals by the metal thin lines 316A-316D, respectively.

[0034] A semiconductor device 314 and the metal thin lines 316A-316D are closed with closure resin 317, and a plastic molded type semiconductor device as shown in drawing 3 is obtained.

[0035] As mentioned above, with the gestalt of the 3rd operation, in each stage of the wiring substrate 301 in which a semiconductor device is carried, ring-like wiring 304for power sources A or ring-like wiring 306A for touch-down is formed so that the post-like wiring 303 for signals or the point (a part for a connection with the metal thin line 319 metallurgy group thin lines 316A-316D in the post-like wiring 303 for signals or 305) of 305 may be surrounded. That is, on the same field of a substrate, it is located outside by the amount of [with the metal thin line of ring-like wiring] connection, and is located by the amount of [with the metal thin line of post-like wiring] connection inside. Furthermore, since ring-like wiring is formed after post-like wiring, a part for each connection of post-like wiring on the same field of a substrate and the metal thin line in ring-like wiring will be formed in the location from the same field of a substrate where the direction for a connection [thin line / in ring-like wiring / metal] is higher than a part for a connection with the metal thin line in post-like wiring. therefore, the electrodes 315A-315D of a semiconductor device 314 and wiring (the object for power sources, and the ring-like wiring 304A and 306A for touch-down --) on a substrate Metal thin line 316B connected to the short circuit of metal thin lines, for example, ring-like wiring 304A for power sources, when the post-like wiring 303 and 305 for signals was connected with the metal thin lines 316A-316D, A short circuit with metal thin line 316A connected to the post-like wiring 303 for signals can be prevented, and the dependability of the semiconductor device which has many pin-connected construction can be raised. Furthermore, making a metal thin line cross in three dimensions, it also becomes easy to connect the electrode of a semiconductor device and each wiring of a substrate, and its degree of freedom of connection improves.

[0036] In each stage of the wiring substrate 301 in which a semiconductor device is carried moreover, ring-like wiring 304for power sources A or ring-like wiring 306A for

touch-down Since it is formed so that the post-like wiring 303 for signals or the point (a part for a connection with the metal thin line 319 metallurgy group thin lines 316A-316D in the post-like wiring 303 for signals or 305) of 305 may be surrounded The die length of the metal thin lines 316A and 316C which connect the post-like wiring 303 and 305 for signals and the electrodes 315A and 315C of a semiconductor device 314, respectively becomes short [the conventional technique]. Therefore, the increment in the noise in a semiconductor device and lowering of working speed can be controlled.

[0037] Moreover, since ring-like wiring is arranged through the insulating layer 318 which consists of heat resistant resin after post-like wiring Ring-like wiring 304for power sources A, and ring-like wiring 306A for touch-down, being pushed by metal thermocompression bonding tools, such as stainless steel heated by 100 degrees C - about 400 degrees C Even if the insulating adhesives 302 fuse with the heat at the time of arranging through an insulating layer on the post-like wiring 303 for signals, and 305 and the insulating adhesives 302 ooze out into a post-like wiring part It can control that the area of the part to which an insulating layer 318 connects a metal thin line [in / for the part into which the insulating adhesives 302 oozed out / post-like wiring] by that of a wrap decreases.

[0038]

[Effect of the Invention] The inside of the connection of two kinds of wiring which was formed on the same side of a substrate according to the plastic molded type semiconductor device in this invention, Since the connections located in the distance from the semiconductor device are higher than the connection located near the semiconductor device, the height from the same field of a substrate It can prevent contacting the short circuit of metal thin lines, and wiring on the substrate to which a metal thin line should not be connected essentially. The dependability of the semiconductor device which has as a result, for example, many pins, can be raised.

[0039] Moreover, according to the plastic molded type semiconductor device in this invention, since the die length of the metal thin line in which it is located near the semiconductor device and which ties wiring for actuating signals and the electrode of a semiconductor device rather than the connection of wiring for power sources or wiring for touch-down becomes shorter than before, the connections of wiring for actuating signals of a semiconductor device can control the increment in a noise and the lowering of working speed in a semiconductor device.

[0040] Moreover, according to the plastic molded type semiconductor device in this invention, the 1st wiring is formed on a substrate and the 2nd wiring is formed through an insulating layer on the 1st wiring. Therefore, since the stress by the exudation is eased by the insulating layer even if the insulating adhesives used in order to form the level difference section of a substrate ooze out on the 1st wiring

with the heat applied at the time of manufacture of a semiconductor device etc., it can control that the area of the part which the metal thin line in the 1st wiring connects decreases.

[0041] Furthermore, since the 2nd wiring is formed through an insulating layer on the 1st wiring When the 1st wiring is post-like wiring for signals and the 2nd wiring is a power source or ring-like wiring for touch-down, even if it brings the 1st wiring close to a semiconductor device and forms it rather than the 2nd wiring In order to connect the 1st wiring which is post-like wiring for signals to an external terminal, it becomes unnecessary to form the 1st wiring in the field of an opposite hand with the field of the direction in which the 1st wiring in a substrate was formed. That is, it becomes unnecessary to form opening for connecting the 1st wiring and an external terminal on the substrate with which the 1st wiring was formed, and the production process of a semiconductor device can be simplified.

[0042] With the 1st connection with the 1st metal thin line [in / on the other hand, according to the manufacture approach of the plastic molded type semiconductor device in this invention, the 1st and 2nd wiring is formed on the same field of a substrate, and / the 1st wiring] The height from the same field of a substrate among the 2nd connection with the 2nd metal thin line in the 2nd wiring A semiconductor device is carried on the substrate with which the connections located in the distance from the semiconductor device loading side are higher than the connection of the direction located near the semiconductor device loading side. By connecting the 1st electrode and the 1st connection of a semiconductor device with the 1st metal thin line, and connecting the 2nd electrode and the 2nd connection of a semiconductor device with the 2nd metal thin line It can prevent contacting the short circuit of metal thin lines, and wiring on the substrate to which a metal thin line should not be connected essentially.

[Brief Description of the Drawings]

[Drawing 1] It is the sectional view and top view of a plastic molded type semiconductor device showing the gestalt of operation of the 1st of this invention.

[Drawing 2] It is the sectional view and top view of a plastic molded type semiconductor device showing the gestalt of operation of the 2nd of this invention.

[Drawing 3] It is the sectional view and top view of a plastic molded type semiconductor device showing the gestalt of operation of the 3rd of this invention.

[Description of Notations]

101,201,301: Wiring substrate

101A-101E, 201A-201E, 301A-301E: Substrate

102,202,302: Insulating adhesives

103,203,303: Post-like wiring for signals

104,204,304A: Ring-like wiring for power sources

304B: Post-like wiring for power sources
105,205,305: Post-like wiring for signals
106,206,306A: Ring-like wiring for touch-down
306B: Ring-like wiring for touch-down
107,207,307: Wiring
108A-108E, 208A-208E, 308A-308E: External terminal
109A-109E, 209A-209E, 309A-309E: Opening
110A-110E, 210A-210E, 310A-310E: Copper (Cu) plating film
111,211: Copper (Cu) plating film
112,212: (Nickel nickel) plating film
113,213: Golden (Au) plating film
114,214,314: Semiconductor device
115A-115D, 215A-215D, 315A-315D: Electrode
116A-116D, 216A-216D, 316A-316D, 319:metal thin line
117,217,317: Closure resin
318: Insulating layer